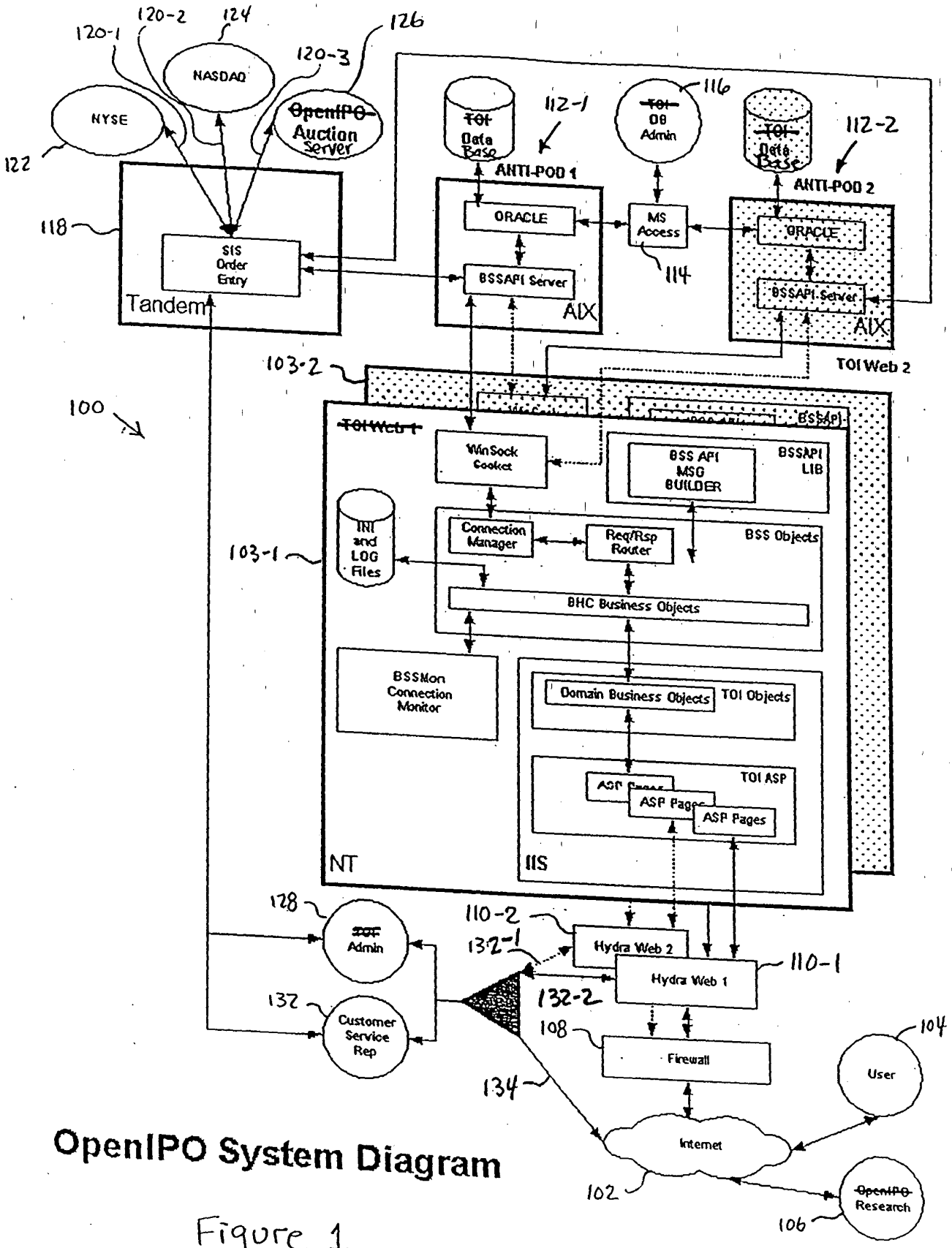


OpenIPO System Diagram

Figure 1

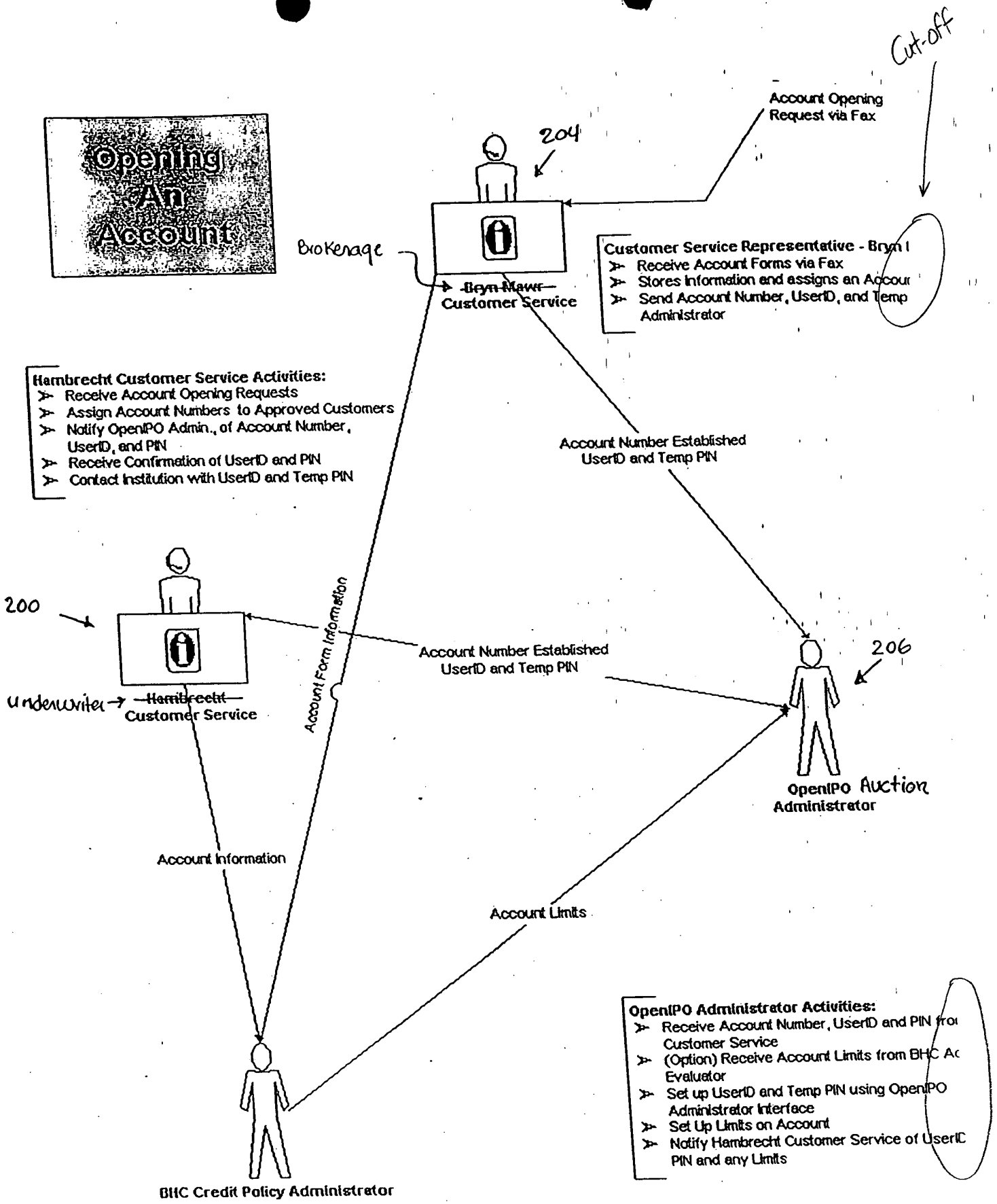

Opening An Account
Cut-off
Account Opening Request via Fax
204
Brokerage
~~Bryn Mawr~~ Customer Service
Customer Service Representative - Bryn I
Receive Account Forms via Fax
Stores information and assigns an Accour
Send Account Number, UserID, and Temp
Administrator
Hambrecht Customer Service Activities:
Receive Account Opening Requests
Assign Account Numbers to Approved Customers
Notify OpenIPO Admin., of Account Number, UserID, and PIN
Receive Confirmation of UserID and PIN
Contact Institution with UserID and Temp PIN
Account Number Established UserID and Temp PIN
200
Underwriter → ~~Hambrecht~~ Customer Service
Account Form Information
Account Number Established UserID and Temp PIN
206
OpenIPO Auction Administrator
Account Information
Account Limits
OpenIPO Administrator Activities:
Receive Account Number, UserID and PIN fro
Customer Service
(Option) Receive Account Limits from BHC Ac
Evaluator
Set up UserID and Temp PIN using OpenIPO Administrator Interface
Set Up Limits on Account
Notify Hambrecht Customer Service of UserIC PIN and any Limits
BHC Credit Policy Administrator

Figure 2

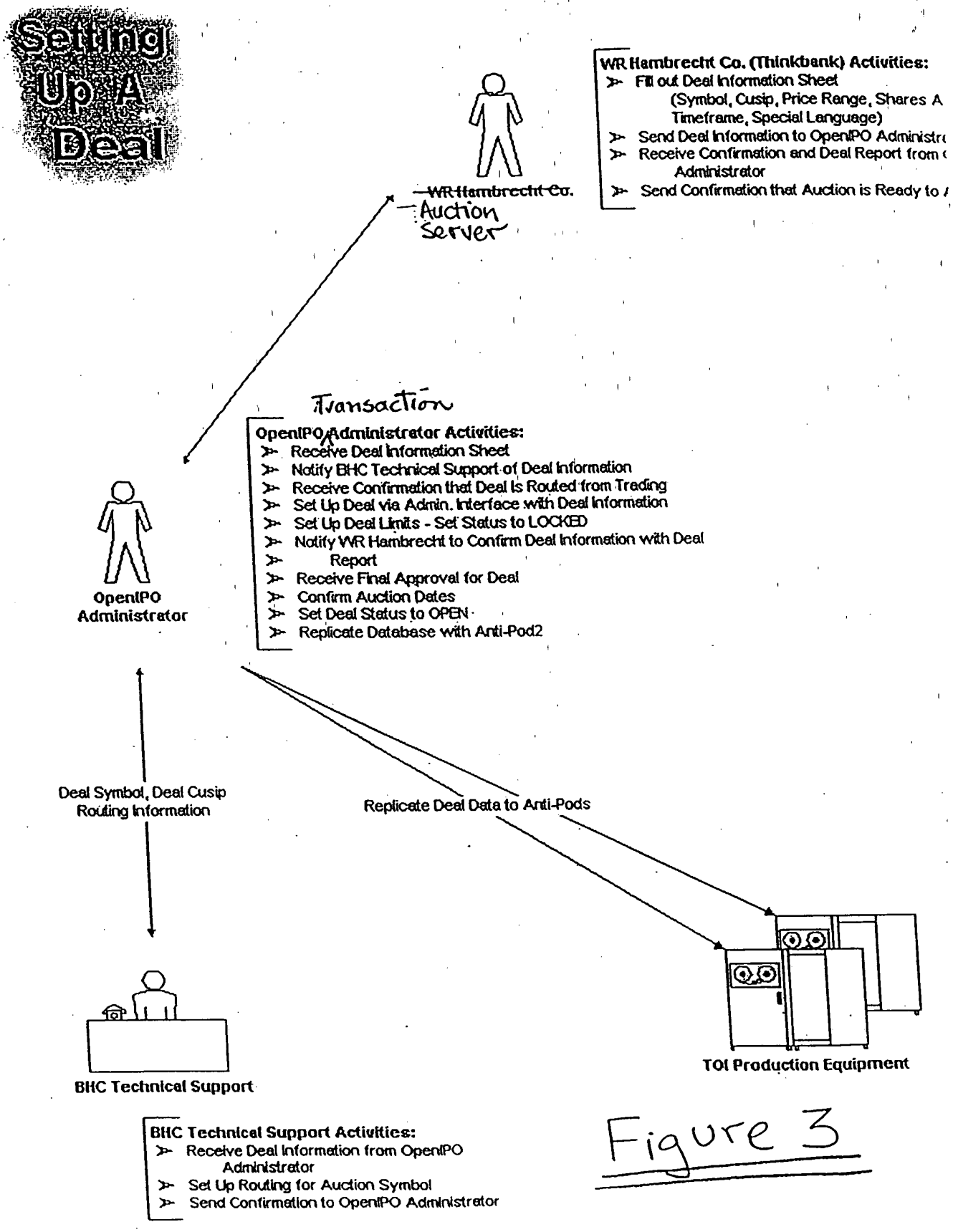
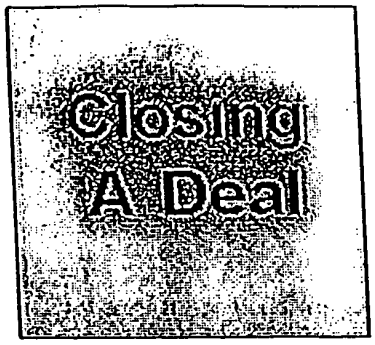

Setting Up A Deal
WR Hambrecht Co. (Thinkbank) Activities:
Fill out Deal Information Sheet
(Symbol, Cusip, Price Range, Shares A
Timeframe, Special Language)
Send Deal Information to OpenIPO Administr
Receive Confirmation and Deal Report from
Administrator
Send Confirmation that Auction is Ready to
WR Hambrecht Co.
Auction Server
Transaction
OpenIPO Administrator Activities:
Receive Deal Information Sheet
Notify BHC Technical Support of Deal Information
Receive Confirmation that Deal is Routed from Trading
Set Up Deal via Admin. Interface with Deal Information
Set Up Deal Limits - Set Status to LOCKED
Notify WR Hambrecht to Confirm Deal Information with Deal
Report
Receive Final Approval for Deal
Confirm Auction Dates
Set Deal Status to OPEN
Replicate Database with Anti-Pod2
OpenIPO Administrator
Deal Symbol, Deal Cusip Routing Information
Replicate Deal Data to Anti-Pods
BHC Technical Support
TOI Production Equipment
BHC Technical Support Activities:
Receive Deal Information from OpenIPO Administrator
Set Up Routing for Auction Symbol
Send Confirmation to OpenIPO Administrator

Figure 3



WR Hambrecht Co.

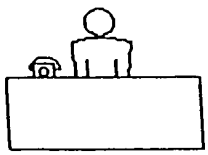
WR Hambrecht Co. Activities:
- Notify OpenIPO Administrator to Start the Closi
- Receive Notification that Deal is Locked
- Conduct Final Bid Confirmation Process (~24 h
- Notify OpenIPO Of Auction Status (Re-Open o
- Receive Notification that Deal is Closed from O Admin.

OpenIPO Administrator

OpenIPO Administrator Activities:
- Receive Notification that Deal is going to Close
- Update Closing Date in Admin. Interface
- Set Deal Status to LOCKED
- Replicate Database to Anti-Pod2
- Notify BHC Technical Support to delete Symbol Routing
- Notify WR Hambrecht that Deal is Locked
- Receive Notification of Auction Status (Re-Open or Close) from WR Hambrecht
- If Re-Open, change Deal Status to OPEN and Notify HC Technical Support - Trading to establish S
- If Close, Change Deal Status to Close and Notify BHC Technical Support - Trading to delete Symb
- Receive Confirmation that routing is deleted from BHC Technical Support - Trading
- Notify WR Hambrecht that Deal has been Closed

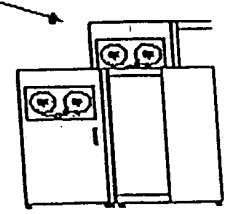
Routing Instructions/ Confirmation

Replicate Deal Data to Anti-Pods



BHC Technical Support Trading

SIS/Trading Support Activities:
- Receive Routing Instructions from OpenIPO Administrator
- Delete Routing for Deal Symbol
- Send Confirmation that Routing is terminated.



TOI Production Equipr

Figure 4

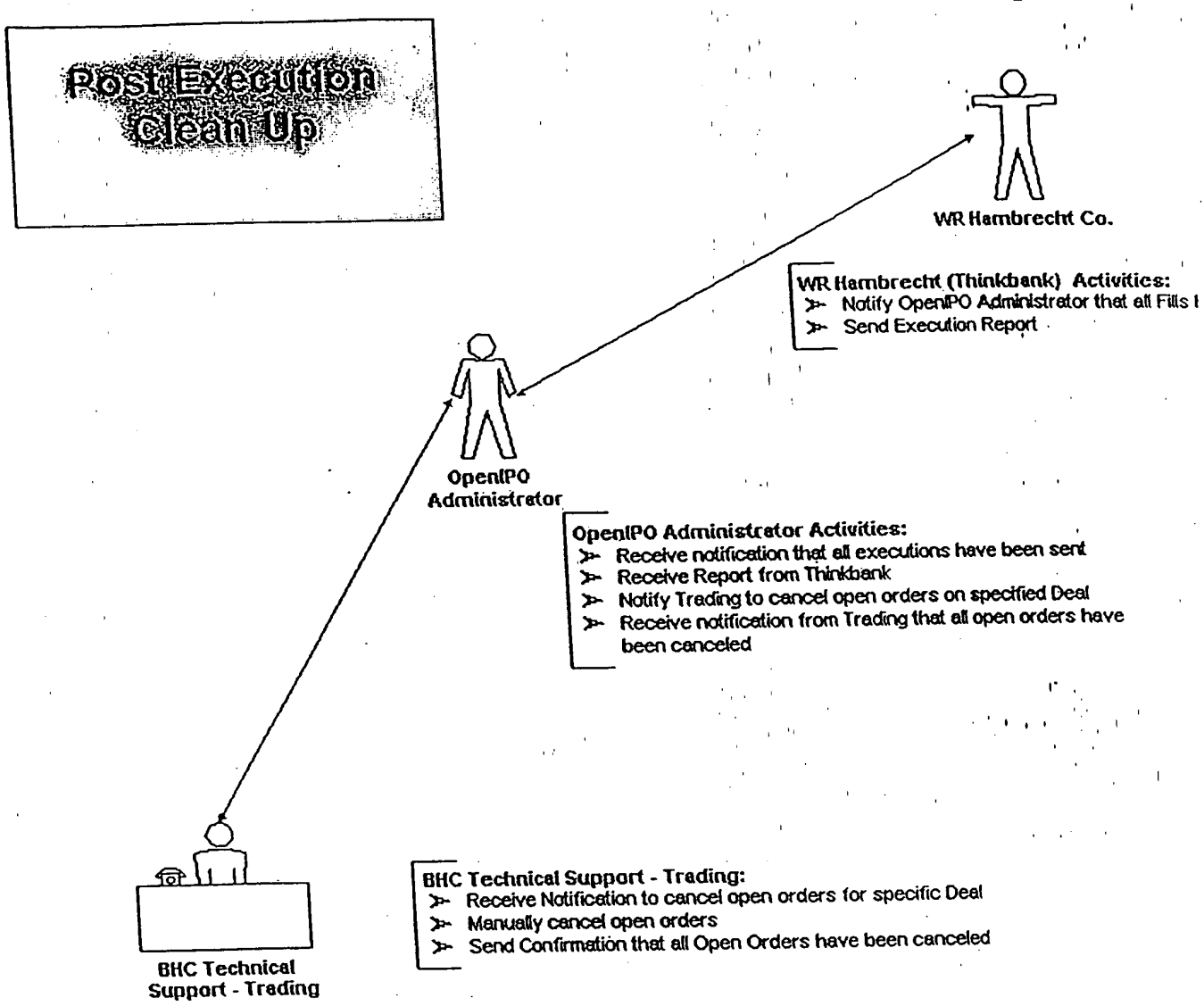

Post Execution Clean Up
WR Hambrecht Co.
WR Hambrecht (Thinkbank) Activities:
Notify OpenIPO Administrator that all Fills I
Send Execution Report
OpenIPO Administrator
OpenIPO Administrator Activities:
Receive notification that all executions have been sent
Receive Report from Thinkbank
Notify Trading to cancel open orders on specified Deal
Receive notification from Trading that all open orders have been canceled
BHC Technical Support - Trading
BHC Technical Support - Trading:
Receive Notification to cancel open orders for specific Deal
Manually cancel open orders
Send Confirmation that all Open Orders have been canceled

Figure 5

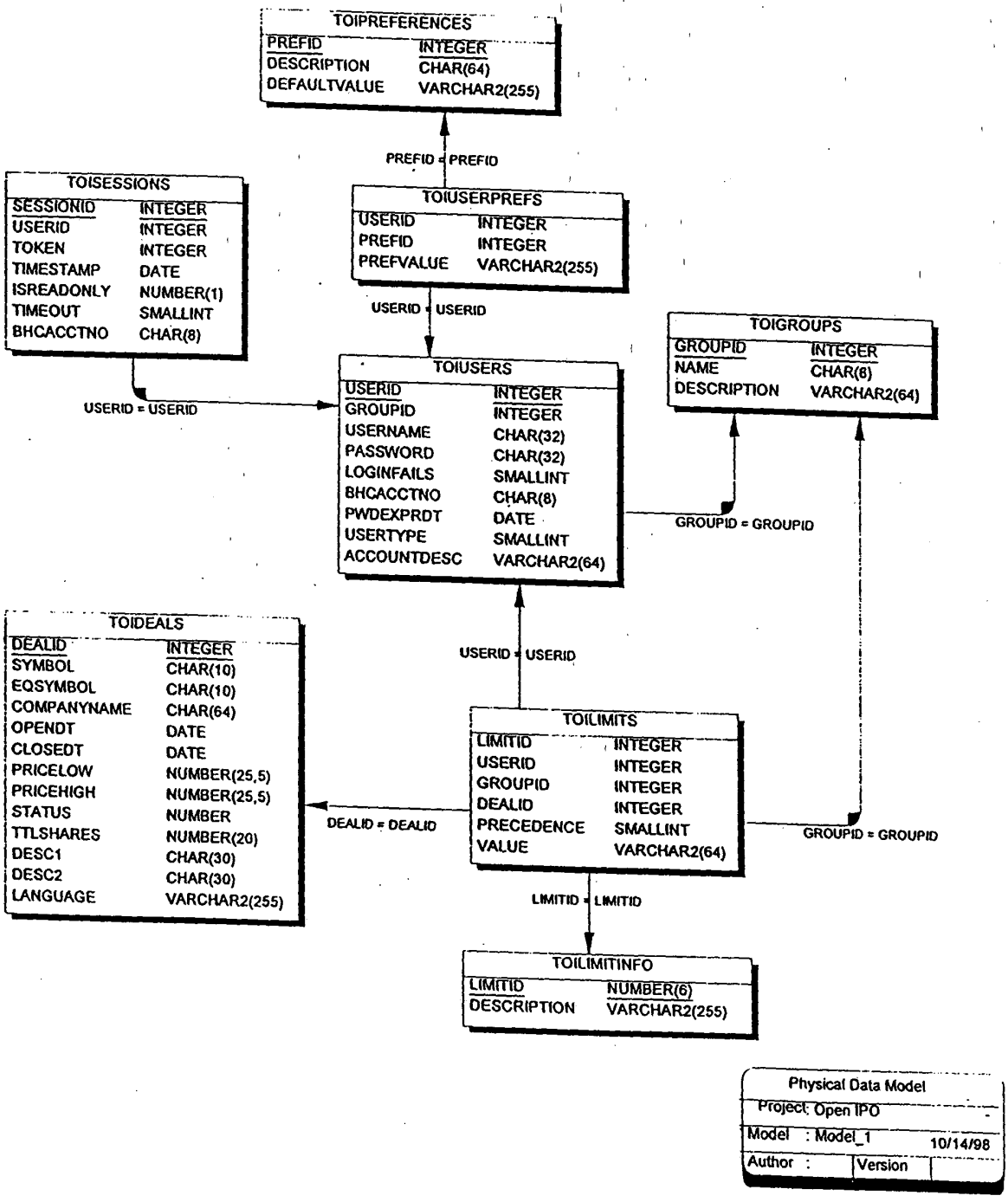

TOIPREFERENCES
PREFID INTEGER
DESCRIPTION CHAR(64)
DEFAULTVALUE VARCHAR2(255)
PREFID = PREFID
TOISESSIONS
SESSIONID INTEGER
USERID INTEGER
TOKEN INTEGER
TIMESTAMP DATE
ISREADONLY NUMBER(1)
TIMEOUT SMALLINT
BHCACCTNO CHAR(8)
TOIUSERPREFS
USERID INTEGER
PREFID INTEGER
PREFVALUE VARCHAR2(255)
USERID = USERID
TOIGROUPS
GROUPID INTEGER
NAME CHAR(8)
DESCRIPTION VARCHAR2(64)
USERID = USERID
TOIUSERS
USERID INTEGER
GROUPID INTEGER
USERNAME CHAR(32)
PASSWORD CHAR(32)
LOGINFAILS SMALLINT
BHCACCTNO CHAR(8)
PWDEXPRDT DATE
USERTYPE SMALLINT
ACCOUNTDESC VARCHAR2(64)
GROUPID = GROUPID
TOIDEALS
DEALID INTEGER
SYMBOL CHAR(10)
EQSYMBOL CHAR(10)
COMPANYNAME CHAR(64)
OPENDT DATE
CLOSEDT DATE
PRICELOW NUMBER(25,5)
PRICEHIGH NUMBER(25,5)
STATUS NUMBER
TTLSHARES NUMBER(20)
DESC1 CHAR(30)
DESC2 CHAR(30)
LANGUAGE VARCHAR2(255)
USERID = USERID
TOILIMITS
LIMITID INTEGER
USERID INTEGER
GROUPID INTEGER
DEALID INTEGER
PRECEDENCE SMALLINT
VALUE VARCHAR2(64)
DEALID = DEALID
GROUPID = GROUPID
LIMITID = LIMITID
TOILIMITINFO
LIMITID NUMBER(6)
DESCRIPTION VARCHAR2(255)
Physical Data Model
Project: Open IPO
Model : Model_1
10/14/98
Author :
Version

FIGURE 6

(1)

Architecture of Auction Server

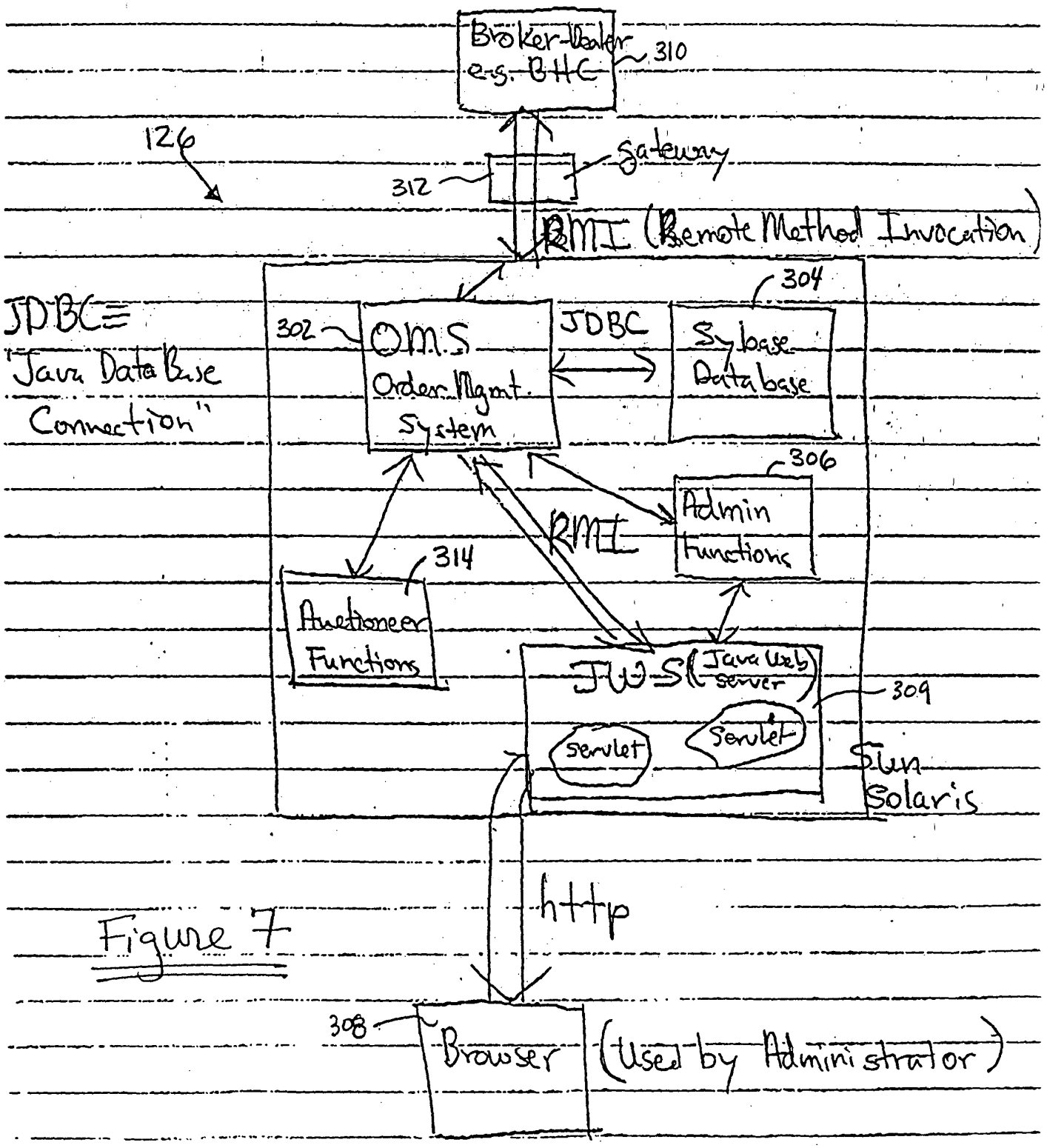


Figure 7

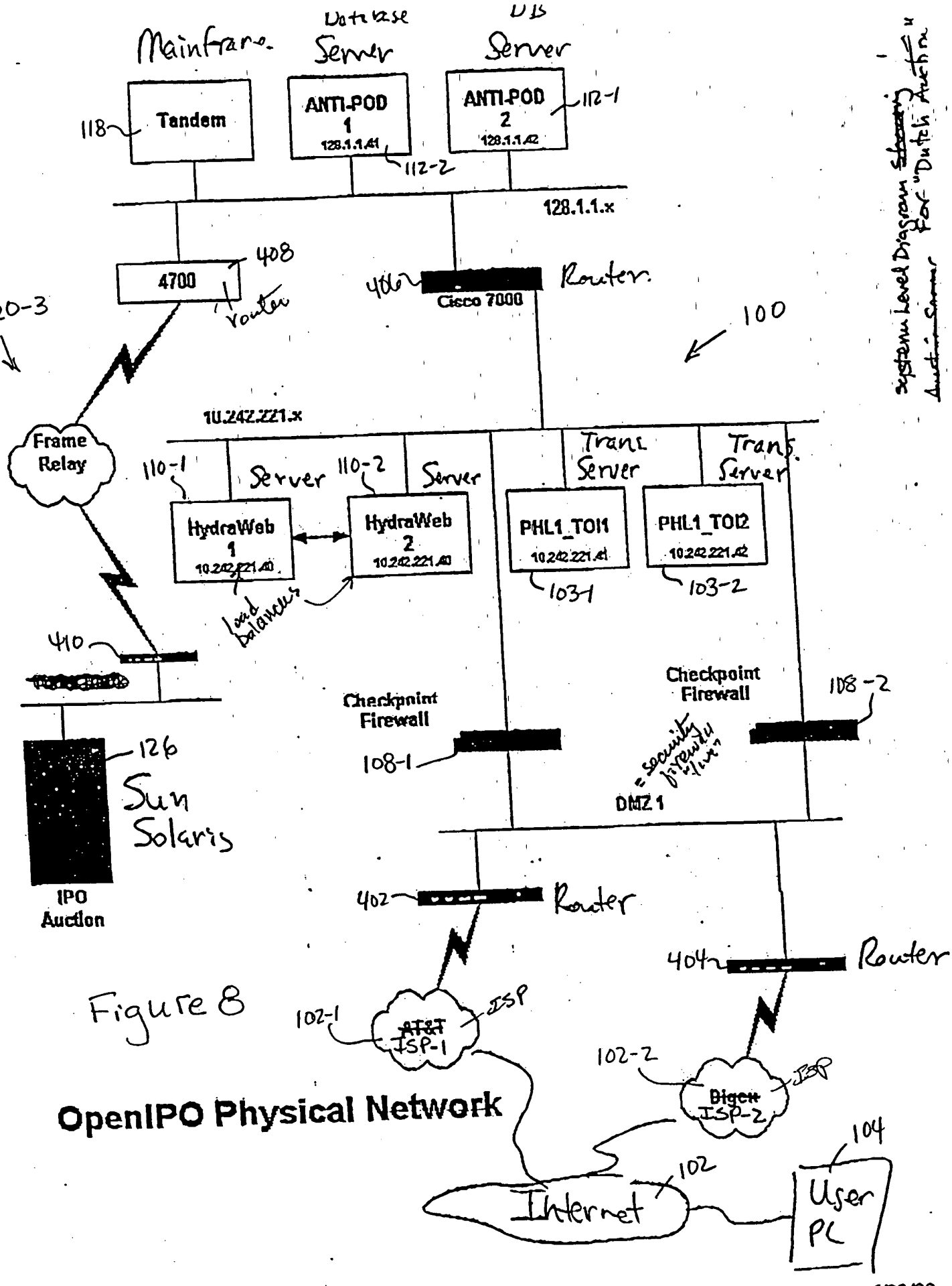


Figure 8

OpenIPO Physical Network

System Level Diagram Showing Flow for "Dutch Auction"

6/23/99

Business Process Flow: OpenIPO Admin: Pre-Auction or During Auction

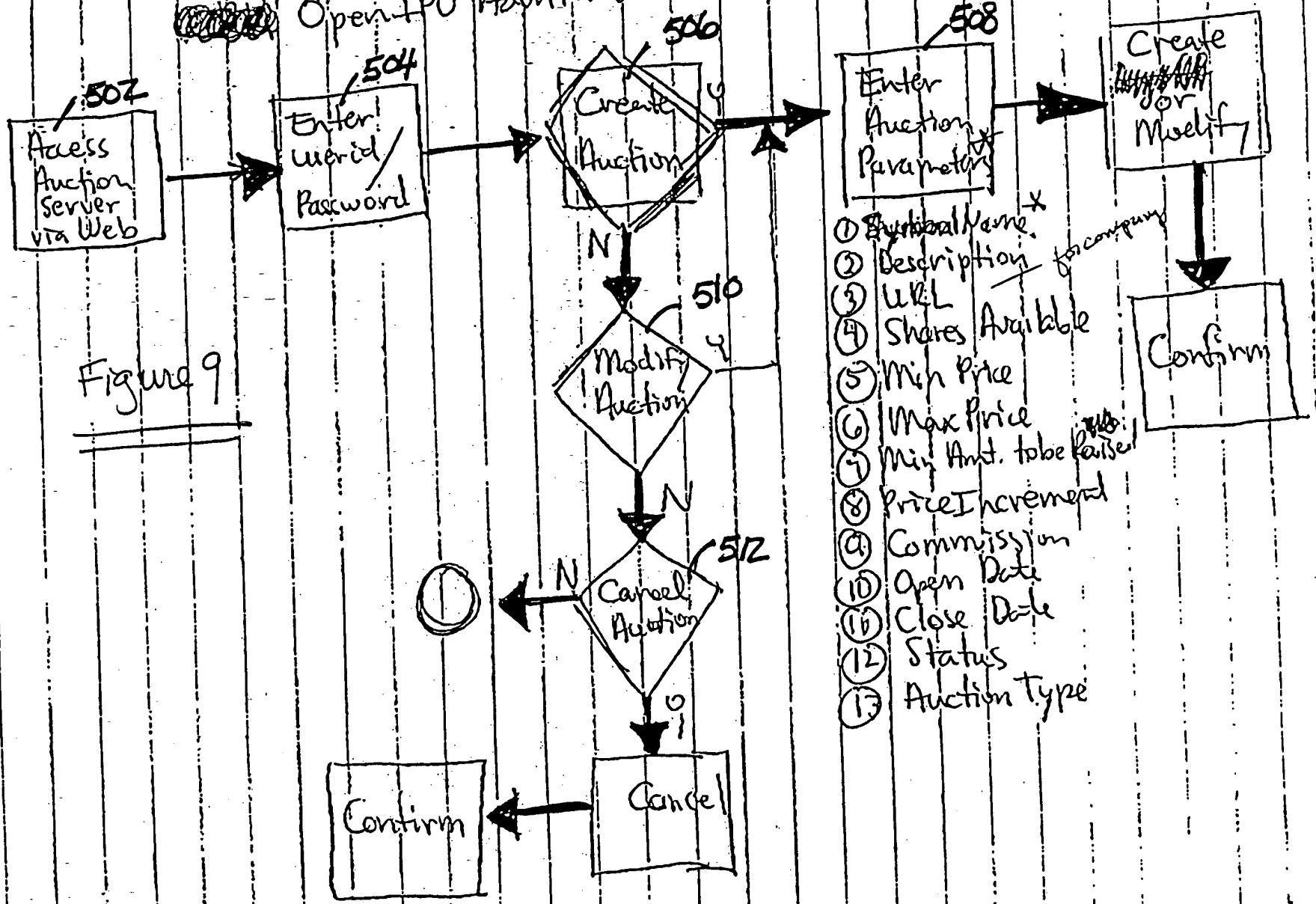


Figure 9

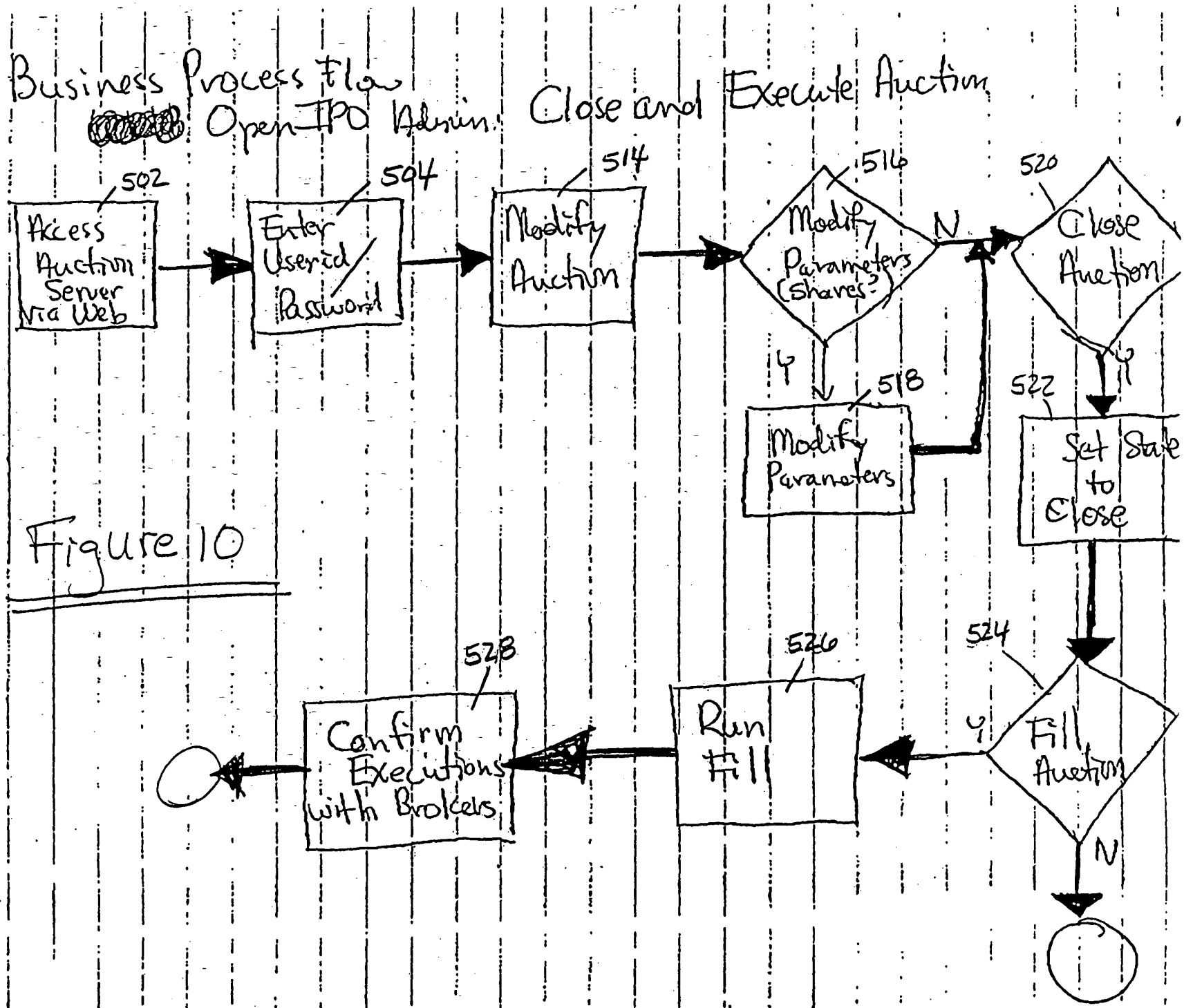

Business Process Flow
Open IPO Admin: Close and Execute Auction
502
Access Auction Server via Web
504
Enter Userid / Password
514
Modify Auction
516
Modify Parameters (Shares?
N
520
Close Auction
Y
Y
518
Modify Parameters
522
Set State to Close
524
Fill Auction
Y
N
526
Run Fill
528
Confirm Executions with Brokers

Figure 10

Business Process Flow
Bid Flow
Bid Order from User
Order related to Customer Account
Order Reveal
Return
Cancel Order
Y
N
546
Cancel Order Cancelled
548
Cancel Order Partial
550
Order Filled
Order Partially Filled
Bill Customer Account Credited
Modify Order
N
Y
530
Open Order Created
532
Modify Order Cancelled
540
Modify Order Partial
542
Auction Modifies Order
544
Auction Cancels Order
552
Open Order Routed to Auction Engine
554
Auction Generates Open Order
556
Bid Stack Updated
Close Auction
Y
N
Run Fills
Order Unfilled
Order Open After Clearing Price
Price At Clearing Price
Y
N
Y
N

Figure 11

Business Process Flow: User

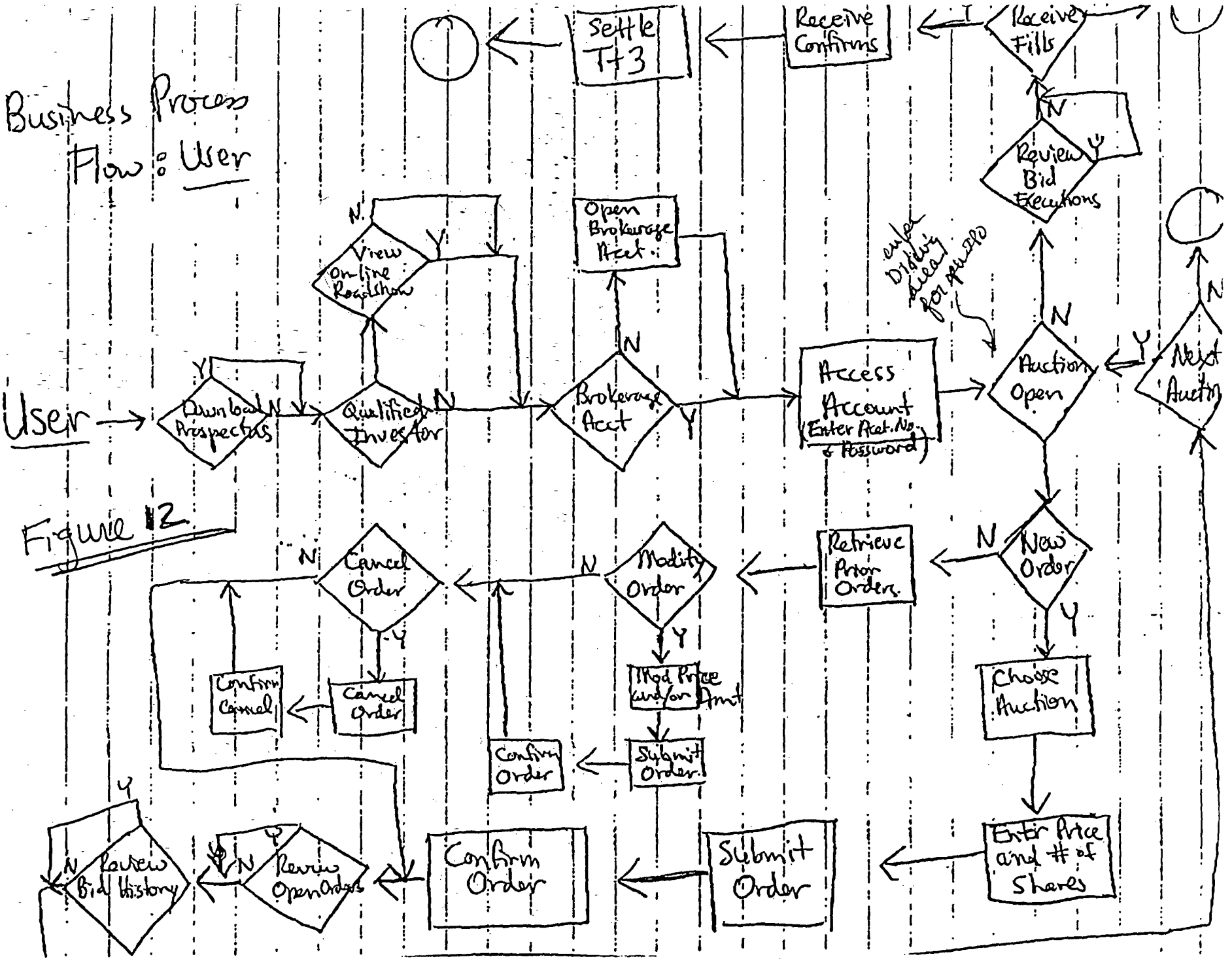


Figure 12

Business Process Flow
Order Settlement

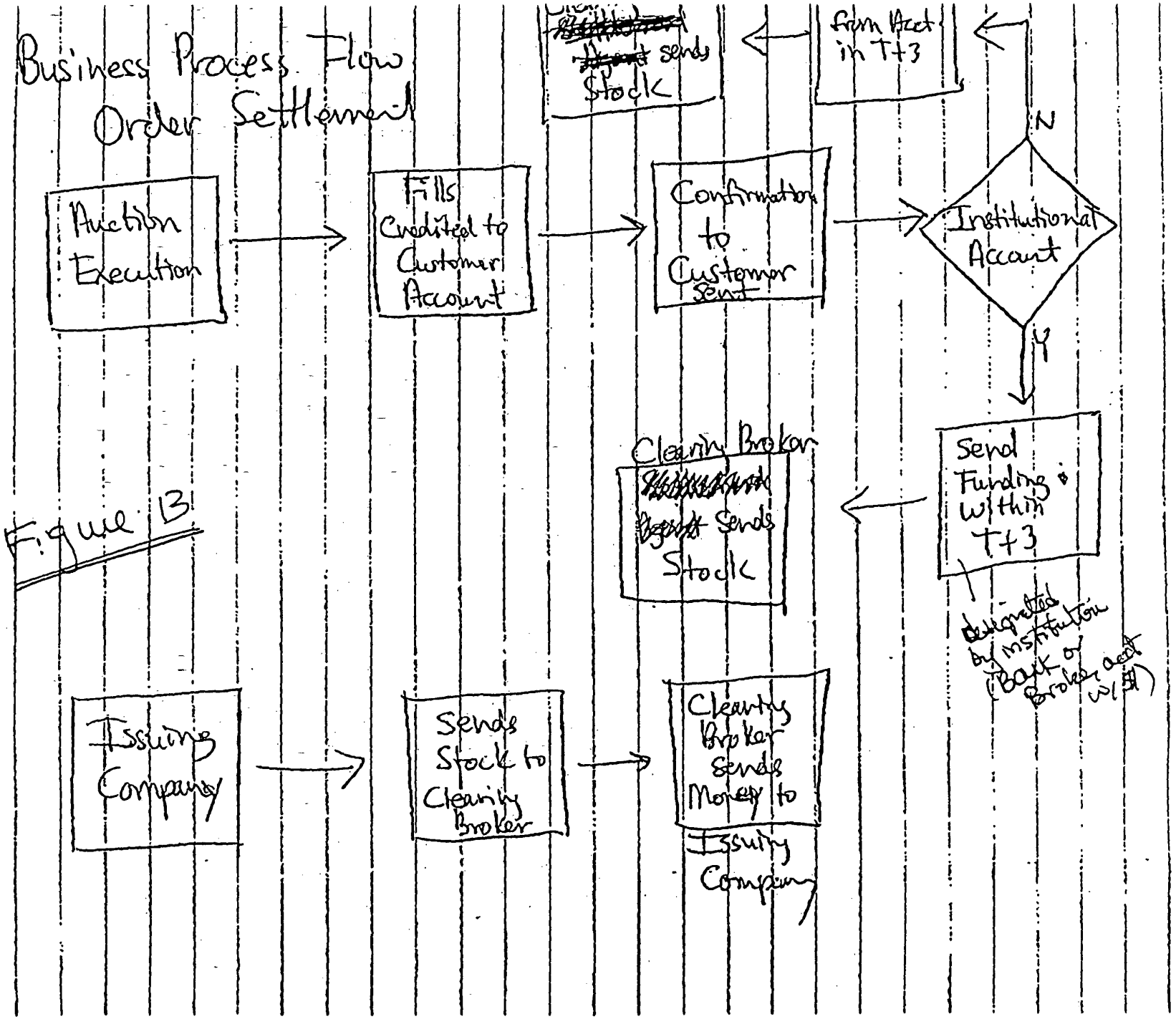


Figure 13

Business Process Flow: Dutch Auction Algorithm.

m = # of Price levels

P_p = price at pth price level : $\begin{cases} P_1 = \text{Max Price Level} \\ P_m = \text{Min. Price Level} \end{cases}$

X_p = # of Shares at price P_p

π_i = price of ith bid.

B_i = # of shares of ith Bid

f_i = fill of ith bid

S = # of offered shares

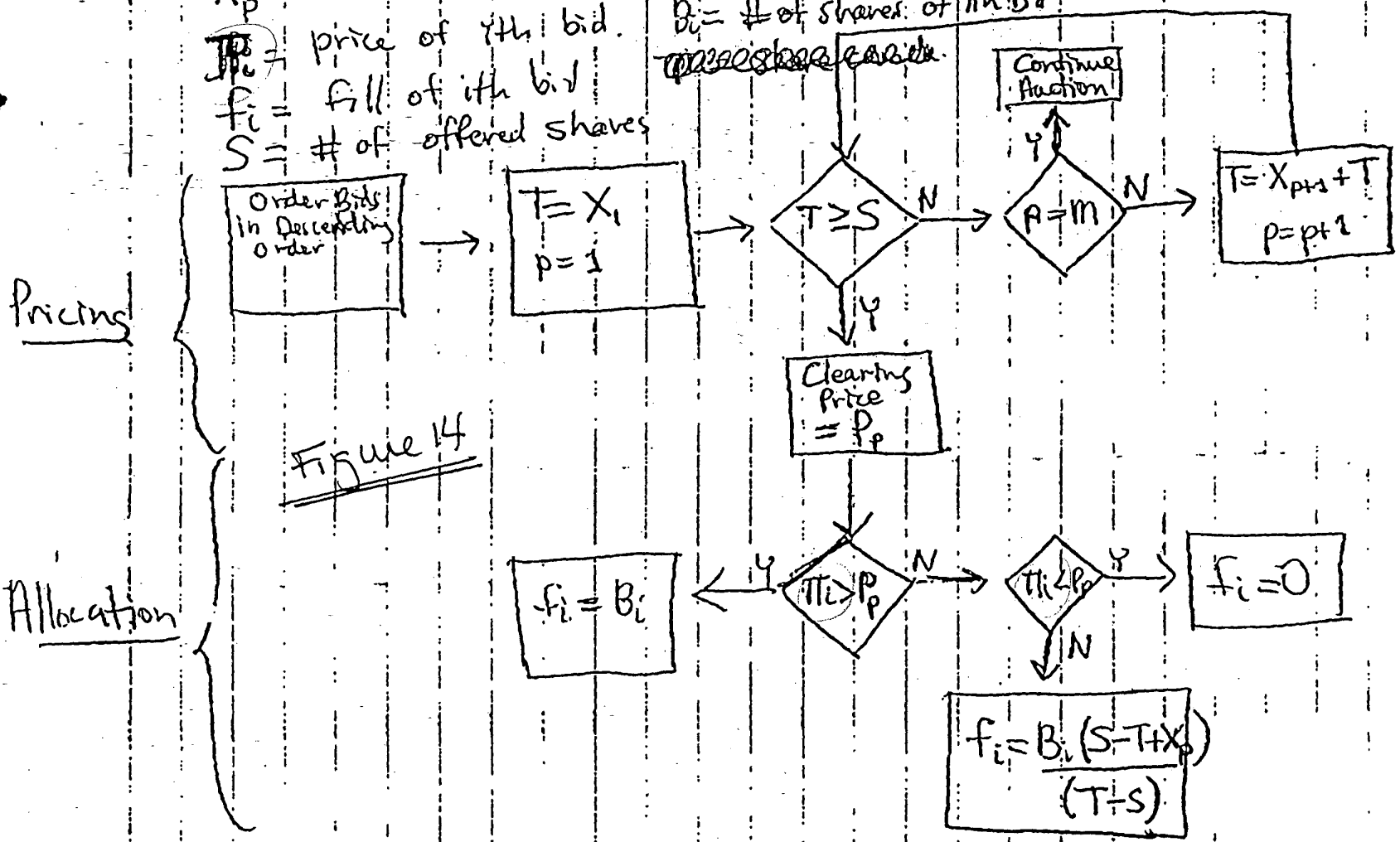


Figure 14